

REMARKS/ARGUMENTS

In this response, the Applicant has made changes to the specification and the claims to address the objections raised by the Examiner related to several informalities.

Additionally, the Applicant has amended claims 1, 3-6 and 9, and added new claims 10-14, to particularly point out certain novel features of the present invention. The Applicant respectfully submits that the aforementioned changes do not add new matter, and that the amended and claims are supported by the previously filed specification.

Drawings

The Applicant thanks the Examiner for pointing out certain errors pertaining to the drawings, which have now been corrected. In particular, as provided above, the second line of paragraph 63 should read Figure 4, not Figure 8. Likewise, in paragraph 66, the second last line, Figure 8 should be changed to Figure 4, which corrects the errors pointed out by the Examiner.

Specification

The specification has been amended to address the informalities raised by the Examiner on pages 9, 10 and 15-17 of the application.

In addition, other changes have been made in the specification to clear up the confusion surrounding the reference labels.

The abstract has been amended to correct the expression "The enables sealing surfaces..."

Claim Objections

The specification has been amended, as suggested by the Examiner, to address the informalities in claims 1, 5, 8 and 9.

Rejection Under 35 U.S.C. §112

The Examiner has rejected claims 1-9 under 35 U.S.C. §112, second paragraph. The Applicant has accordingly changed claim 1 to make clear that the complementary flow field plate is not the first one cited, but rather another plate.

In claims 1, 4-6 and 9, the expression "aperture extension" has been changed to "extension" to make this term clear. The Applicant has not changed "for each aperture, at least one slot," and other similar expressions, because this is not meant to imply that each aperture includes at least one slot. Rather, what is meant is that to each aperture there can be associated at least one slot, and it is submitted that in the context, this wording is entirely clear.

Rejection Under 35 U.S.C. §102

The Examiner has rejected claim 9 under 35 U.S.C. §102(b) as anticipated by Washington et al. (US 5,750,281). Reconsideration thereof is requested in light of the following.

The instant claim 9 recites gas diffusion media, in addition to the membrane electrode assembly, provided within the fuel cell chamber. The gas diffusion media enable diffusion of the appropriate gas, either the fuel or oxidant, to the surface of the proton exchange membrane, and at the same time provide for conduction of electricity between the associated flow field plate and the proton exchange membrane. In

contrast, Washington et al. do not teach a gas diffusion media within the fuel cell chamber, or anywhere else in the fuel cell assembly.

Additionally, instant claim 9 requires that the first and second (i.e., the anode and cathode) flow field plates include respective first and second slots extending from their first and second reactant gas flow channels on the front sides of the plates to the rear sides of the plates. Further, it is specified, in claim 9, that the first and second plates include, on the rear sides of the plates, first and second extensions between the respective apertures and first and second slots, to provide for flow of the reactant gases from each aperture through the extension, and then through the slot to the reactant gas flow channels on the front of the plate (or in the reverse direction).

This arrangement, like that specified in other claims, addresses the fundamental requirement in this art of supplying reactant gases to the front or active areas of flow field plates, while providing a seal around the active area. It does this in a simple manner, which does not require any additional components or seals. As noted in the introduction of the present specification, see for example paragraph 0009, a 30 cell stack could require a total of 91 seals. Thus based on the basic requirement for individual flow field plates and seals between them, there are a large number of seals in any fuel cell stack. The present invention addresses the problem of providing the necessary sealing around the active area and supply of gas to and from the active area, without complicating the structure of the stack.

The Washington et al. (U.S. 5,750,281) patent, like other art in this area, does recognize the problem of providing a seal around the active area, but its solution to this problem is radically different, and results in a complex structure. As Figure 5 of the '281 patent shows, a flow field plate 108 could be provided with two edge manifolds 120, 120', and in addition to ensure sealing between the edge manifolds and the plate, a plurality of tubes, for example 146, are provided. Correspondingly, it is necessary to provide

channels or holes in both the manifold and the flow field plate, which must accurately align with one another to accommodate these tubes. It is suggested (column 8, lines 45-47) that the edge manifold plates could be secured by an adhesive.

This arrangement may deal with the gas flow problem, namely providing supply of a gas to and from the active area of a plate, while enabling a seal around the active area to be maintained, but the structure is surprisingly complicated and requires numerous separate components for each flow field plate.

More strikingly, the sealing problem would appear to be compounded rather than simplified. The '281 patent is notable for saying little about the sealing between the individual flow field plates, and it is apparently taken that the sealing between the flow field plates would be largely conventional. As the cross section of Figure 3 shows, it is intended that separate gaskets 122 be provided between each of the edge manifolds 120. Thus, while this patent may have solved the gas flow problem, it has made the overall structure of the stack considerably more complicated, introduced a large number of additional components and, as a necessary result, then introduced a large number of additional seals. All of these components would need to be manufactured to tight tolerances, if these seals are to be in any way effective.

Turning to the passage on column 9 and Figure 9, as cited by the Examiner, this shows a detail, where the manifold opening 136 (or aperture) is provided with a channel 176 through the edge manifold plate 120, that continues into a channel 182 in a cathode plate 108, and then opens into an oxidant flow channel 152. Although expressly labeled, Figure 9 suggests the presence of some metallic tube or the like in the channels 176, 182, to form the necessary seal; again, the various components would have to be machined or manufactured to tight tolerances if these channels are to be aligned with one another.

Figure 9 is also noteworthy for showing the presence an anode flow field plate 112, and indicates that the cathode and anode plates 108, 112 are mated together in back to back fashion.

There is no teaching or suggestion that, somehow or another, gas could be introduced from the rear of the cathode flow field plate and then through the plate to the front side thereof. Rather, the only teaching is that a channel be provided through the edge of the plate 108, in order to supply gas to the oxygen flow channel 152. There is actually nothing in the patent that would give any suggestion to a skilled person to use the rear side of the flow field plate to introduce gas to the front side thereof. Rather, following conventional teaching in the art, the only indication is that coolant channels could be provided between the facing, rear sides of the anode and cathode plates.

Accordingly, the Examiner's rejection under 35 USC 102(d) is respectfully traversed, and the Examiner is requested to withdraw this rejection.

Double Patenting

The Examiner has provisionally rejected claims 1-9 under the judicially created Doctrine of Obviousness – Double Patenting as being unpatentable over claims 13-16 and 35 of co-pending application No. 10/109,002. More particularly, the Examiner has argued that, while acknowledging that the conflicting claims are not identical, the co-pending claims 13-16 and 35 of the cited application anticipate and contain all the limitations of claims 1-9 of the present application. More specifically, the Examiner has argued that the instant claims 1-9 are broader than the co-pending claims 13-16 and 35.

The co-pending claims 13 and 16 are both directed to a fuel cell stack, while claim 35 is directed to a flow field plate. Claims 1-8 of the instant application are all directed to a flow field plate, while claim 9 is directed to a fuel cell assembly. Thus it is not seen how

the Examiner can make the sweeping argument that the instant claims 1-9 are all broader than the co-pending claims 13-16 and 35.

The Examiner has apparently cited claims 13, 16 and 35, since they all, in one way or another, introduce the feature of aperture extensions, as that term is used in the other application, or the rear face of flow field plates. Thus these claims, in an entirely conventional manner, introduce an element that is present in the structure claimed in the present invention. This is not unusual. Claims in many applications and patents are simply combinations of elements some of which may be known and some of which may be new, and more often than not, many of these elements can be found in other applications or patents.

What is noteworthy is that all of the claims of the co-pending application 10/109,002 are directed to details of the flow fields and ribs in the active areas on the front faces of the flow field plates, so as to provide support for the membrane exchange assembly.

While there may be some features in common between the two applications, it is submitted that, in no sense, is there any double-patenting. The 10/109,002 application is concerned with details of the front surfaces of the flow field plates, and these details, as claimed, are in no sense obvious in view of the structure as claimed in the present application.

New Claims

The Applicant has added new claims 10-14 directed towards a fuel cell assembly, and a flow field plate for a fuel cell. The Applicant submits that these new claims do not read on any of the teachings of Washington, and that these new claims are supported by the originally filed application.

Drawings

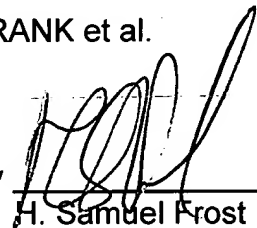
The Applicant has amended Figures 4, 8 and 11 to more clearly point out the invention. In particular, in Figure 4, reference label 218 has been added. In Figure 8, element 182a' has been changed to 182', element 184a' has been changed to 184', element 186a' has been changed to 186', element 182' has been changed to 182a', element 184' has been changed to 184a', and element 186' has been changed to 186a'. In Figure 11, element 160e has been changed to 160ae.

Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Respectfully submitted,

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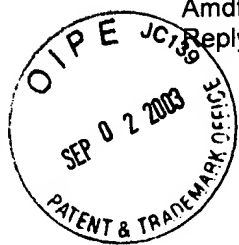
Appl. No. 09/855,018
Amdt. dated August 29, 2003
Reply to Office action of March 31, 2003

Replacement Sheets

Appl. No. 09/855,018

Amdt. dated August 29, 2003

Reply to Office action of March 31, 2003



Annotated Sheet Showing Changes